**EPA OAQPS approaches for temporal allocation of "EGUs" for modeling for 2002 and 2005 platforms**

**Contact:** Marc Houyoux, EPA OAQPS, houyoux.marc (at) epa.gov
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EPA's Office of Air Quality Planning and Standards (OAQPS) has used a specific methodology for base and future-year temporal allocations for both its 2002 and 2005 modeling platforms. This approach is divided into three parts: (1) model performance evaluation and (2) baseline runs for Relative Response Factor (RRF) calculations, and (3) future-year runs (also for RRFs). These approaches affect OAQPS's sector called "ptipm", which represents all of the sources that we have been able to match from the base-year inventory to the units included in the IPM model. These units are primarily electric generating utilities (EGUs), but also include co-generating units at industrial facilities.

For model performance evaluations, OAQPS uses the hourly Continuous Emissions Monitoring (CEM) data for NOx, SO2, and heat input to allocate the annual emissions from the National Emission Inventory (NEI). Since the CEM data do not contain stack-level details (such as stack characteristics and coordinates) needed for air quality modeling, it is necessary to map the unit-level data from the CEMs to the individual stacks and processes in the NEI for allocating those emissions. To do this, OAQPS uses CEM hourly NOx to allocate NOx emissions, CEM hourly SO2 to allocate SO2 emissions, and CEM heat input to allocate all other pollutants from those units. There are some units in the ptipm sector that are not CEMs. For these units, OAQPS uses the same approach as is used in the baseline approach, described next.

For the baseline approach, the same annual NEI emissions are allocated using allocation factors that are averaged across multiple years of CEM data. There are three parts to this allocation: year-to-month, month-to-day, and day-to-hour. The averaging approaches help to alleviate potential problems caused by unplanned downtime at some facilities for any given year, month, or facility. For the year-to-month allocations, the CEM data are used to create state-specific allocation factors by averaging three years of CEM data, with the base year for modeling the central year of the three. For example, the three years for a 2005 baseline are 2004, 2005, and 2006. CEM emissions are summed by month and state across the three years, and the allocation factors are created by dividing these sums by annual sums by state across those same years. As with the model performance run, the NOx data are used to create NOx-specific profiles, the SO2 data is used to create SO2-specific profiles, and the heat input is used to allocate all other pollutants.

Also for the baseline approach, the month-to-day factors are computed using CEM data from only the base year of interest, but the factors are still created by state. For a 2005 baseline, the 2005 CEM data are used, for example. We compute the sum of the CEM emissions in 2005 for the state by day, and we compute the factor as the sum by day and state divided by the sum by month and state. We use the same approach with the NOx CEM data allocating NOx, the SO2 CEM data allocating SO2, and the heat input data allocating all other pollutants.

Finally for the baseline approach, the day-to-hour factors are computed using 3 years of CEM data to compute state-specific, day-to-hour profiles. In this approach, we average the annual CEM data for each hour of the day by state across the three years of CEM data and then we divide by the daily average by state across the three years. The NOx CEM data allocate the NOx emissions, the SO2 CEM data allocate the SO2 emissions, and the heat input CEM data allocate all other pollutants.

EPA OAQPS staff have already identified improvements to these approaches, which we are considering for future modeling efforts. There are two key improvements. First, the spatial averaging could take into account power zones rather than state-level allocations. Second, the averaging could be done by groups of units that fall into certain categories of temporal behavior, such as base load, load following, and peaking units. In addition, with the increasing interest in High Electric Demand Day (HEDD) controls, special consideration is needed to implement temporal allocation in a way that makes sense for these types of needs. In particular, our hourly approach is likely to be insufficient for modeling in support of HEDD control strategy evaluation.

The third part of the approach is to support the future-year modeling. The primary goal of the approach is to keep consistent temporal allocation with the baseline approach. However, since the starting point for the future-year emissions is summer (May through September) and non-summer IPM emissions, the approach gets applied slightly differently. Instead of annual-to-month allocation factors used in the baseline runs, the CEM data are used to compute summer-to-month and non-summer-to-month factors. This approach ensures that the summer and non-summer IPM emissions totals are the same before and after temporal allocation. All other aspects of the temporal allocation approach (from month to day and from day to hour) are the same as in the baseline approach.

To implement the model performance case, EPA uses the SMOKE model that supports using the CEM data directly. For the non-CEM sources in the ptipm sector, EPA creates day-specific data files for input to SMOKE uses custom software tools. These tools are also used to create day-specific SMOKE inputs for the baseline and future-year cases, which apply the annual-to-month (or season-to-month) factors and the month-to-day factors by state and pollutant. The day-specific emissions are fed to SMOKE as an input inventory, and SMOKE applies the day-to-hour factors.